What is Claimed is:

1. A protein comprising an amino acid sequence that codes for a variant protein of the lovE protein having at least one mutation selected from the group consisting of:

(a) a Group 6 amino acid residue mutated to a Group 2 amino acid residue at position 31;

(b) a Group 3 amino acid residue mutated to a Group 5 amino acid residue at position 41;

(c) a Group 4 amino acid residue mutated to a Group 2 amino acid residue at position 52;

(d) a Group 4 amino acid residue mutated to a Group 3 amino acid residue at position 52;

(e) a Group 4 amino acid residue mutated to a Group 5 amino acid residue at position 73;

(f) a Group 1 amino acid residue mutated to a Group 4 amino acid residue at position 101;

(g) a Group 1 amino acid residue mutated to a Group 3 amino acid residue at position 101;

(h) a valine amino acid residue mutated to another Group 2 amino acid residue at position 111;

(i) a Group 4 amino acid residue mutated to a Group 2 amino acid residue at position 133;

(j) a Group 3 amino acid residue mutated to a Group 2 amino acid residue at position 141;

(k) a Group 3 amino acid residue mutated to a Group 5 amino acid residue at position 141;

(l) a Group 4 amino acid residue mutated to Group 6 amino acid residue at position 153;

(m) a Group 4 amino acid residue mutated to a Group 5 amino acid residue at position 153;

(n) a Group 4 amino acid residue mutated to a Group 1 amino acid residue at position 281;

(o) a Group 3 amino acid residue mutated to a Group 2 amino acid residue at position 367;

(p) a Group 3 amino acid residue mutated to a Group 6 amino acid residue at position 367;
(q) a Group 1 amino acid residue mutated to Group 4 amino acid residue at position 389; and
(r) a Group 1 amino acid residue mutated to a Group 2 amino acid residue at position 389.

2. The protein of claim 1, wherein the variant protein has a Group 6 amino acid residue mutated to a Group 2 amino acid residue at position 31.

3. The protein of claim 2 having the mutation F31L.

4. The protein of claim 1, wherein the variant protein has a Group 3 amino acid residue mutated to a Group 5 amino acid residue at position 41.

5. The protein of claim 4 having the mutation Q41K or Q41R.

6. The protein of claim 1, wherein the variant protein has a Group 4 amino acid residue mutated to a Group 2 amino acid residue at position 52.

7. The protein of claim 6 having the mutation T52I.

8. The protein of claim 1, wherein the variant protein has a Group 4 amino acid residue mutated to a Group 3 amino acid residue at position 52.

9. The protein of claim 8 having the mutation T52N.

10. The protein of claim 1, wherein the variant protein has a Group 4 amino acid residue mutated to a Group 5 amino acid residue at position 73.

11. The protein of claim 10 having the mutation C73R.

12. The protein of claim 1, wherein the variant protein has a Group 1 amino acid residue mutated to a Group 4 amino acid residue at position 101.

13 The protein of claim 12 having the mutation P101S.

14. The protein of claim 1, wherein the variant protein has Group 1 amino acid residue mutated to a Group 3 amino acid residue at position 101.

15. The protein of claim 14 having the mutation P101Q.

16. The protein of claim 1, wherein the variant protein has a valine amino acid residue mutated to another Group 2 amino acid residue at position 111.

17. The protein of claim 16 having the mutation V111I.

18. The protein of claim 1, wherein the variant protein has a Group 4 amino acid residue mutated to a Group 2 amino acid residue at position 133.

19. The protein of claim 18 having the mutation S133L.

20. The protein of claim 1, wherein the variant protein has Group 3 amino acid residue mutated to a Group 2 amino acid residue at position 141.

21. The protein of claim 20 having the mutation E141V.

22. The protein of claim 1, wherein the variant protein has a Group 3 amino acid residue mutated to a Group 5 amino acid residue at position 141.

23. The protein of claim 22 having the mutation E141K.

24. The protein of claim 1, wherein the variant protein has a Group 4 amino acid residue mutated to Group 6 amino acid residue at position 153.

25. The protein of claim 24 having the mutation C153Y.

26. The protein of claim 1, wherein the variant protein has a Group 4 amino acid residue mutated to a Group 5 amino acid residue at position 153.

27. The protein of claim 26 having the mutation C153R.

28. The protein of claim 1, wherein the variant protein has a Group 4 amino acid residue mutated to a Group 1 amino acid residue at position 281.

29. The protein of claim 28 having the mutation T281A.

30. The protein of claim 1, wherein the variant protein has Group 3 amino acid residue mutated to a Group 2 amino acid residue at position 367.

31. The protein of claim 30 having the mutation N367I.

32. The protein of claim 1, wherein the variant protein has a Group 3 amino acid residue mutated to a Group 6 amino acid residue at position 367.

33. The protein of claim 32 having the mutation N367Y.

34. The protein of claim 1, wherein the variant protein has a Group 1 amino acid residue mutated to Group 4 amino acid residue at position 389.

35. The protein of claim 34 having the mutation P389S.

36. The protein of claim 1, wherein the variant protein has a Group 1 amino acid residue mutated to a Group 2 amino acid residue at position 389.

37. The protein of claim 36 having the mutation P389L.

38. The protein of claim 1 selected from the group consisting of SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:51, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, and SEQ ID NO:65.

39. A nucleic acid comprising a polynucleotide sequence encoding an amino acid sequence of a variant protein of the lovE protein having at least one mutation selected from the group consisting of:

(a) a Group 6 amino acid residue mutated to a Group 2 amino acid residue at position 31;

(b) a Group 3 amino acid residue mutated to a Group 5 amino acid residue at position 41;

(c) a Group 4 amino acid residue mutated to a Group 2 amino acid residue at position 52;

(d) a Group 4 amino acid residue mutated to a Group 3 amino acid residue at position 52;

(e) a Group 4 amino acid residue mutated to a Group 5 amino acid residue at position 73;

(f) a Group 1 amino acid residue mutated to a Group 4 amino acid residue at position 101;
(g) a Group 1 amino acid residue mutated to a Group 3 amino acid residue at position 101;
(h) a valine amino acid residue mutated to another Group 2 amino acid residue at position 111;
(i) a Group 4 amino acid residue mutated to a Group 2 amino acid residue at position 133;
(j) an Group 3 amino acid residue mutated to a Group 2 amino acid residue at position 141;
(k) an Group 3 amino acid residue mutated to a Group 5 amino acid residue at position 141;
(l) a Group 4 amino acid residue mutated to Group 6 amino acid residue at position 153;
(m) a Group 4 amino acid residue mutated to a Group 5 amino acid residue at position 153;
(n) a Group 4 amino acid residue mutated to a Group 1 amino acid residue at position 281;
(o) a Group 3 amino acid residue mutated to a Group 2 amino acid residue at position 367;
(p) a Group 3 amino acid residue mutated to a Group 6 amino acid residue at position 367;
(q) a Group 1 amino acid residue mutated to Group 4 amino acid residue at position 389; and
(r) a Group 1 amino acid residue mutated to a Group 2 amino acid residue at position 389.

40. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 6 amino acid residue mutated to a Group 2 amino acid residue at position 31.

41. The nucleic acid of claim 40 having the mutation F31L.

42. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 3 amino acid residue mutated to a Group 5 amino acid residue at position 41.

43. The nucleic acid of claim 42 having the mutation Q41K or Q41R.

44. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 4 amino acid residue mutated to a Group 2 amino acid residue at position 52.

45. The nucleic acid of claim 44 having the mutation T52I.

46. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 4 amino acid residue mutated to a Group 3 amino acid residue at position 52.

47. The nucleic acid of claim 46 having the mutation T52N.

48. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 4 amino acid residue mutated to a Group 5 amino acid residue at position 73.

49. The nucleic acid of claim 48 having the mutation C73R.

50. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE

protein having a Group 1 amino acid residue mutated to a Group 4 amino acid residue at position 101.

51. The nucleic acid of claim 50 having the mutation P101S.

52. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having Group 1 amino acid residue mutated to a Group 3 amino acid residue at position 101.

53. The nucleic acid of claim 52 having the mutation P101Q.

54. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a valine amino acid residue mutated to another Group 2 amino acid residue at position 111.

55. The nucleic acid of claim 54 having the mutation V111I.

56. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 4 amino acid residue mutated to a Group 2 amino acid residue at position 133.

57. The nucleic acid of claim 56 having the mutation S133L.

58. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having Group 3 amino acid residue mutated to a Group 2 amino acid residue at position 141.

59. The nucleic acid of claim 58 having the mutation E141V.

60. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 3 amino acid residue mutated to a Group 5 amino acid residue at position 141.

61. The nucleic acid of claim 60 having the mutation E141K.

62. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 4 amino acid residue mutated to Group 6 amino acid residue at position 153.

63. The nucleic acid of claim 62 having the mutation C153Y.

64. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 4 amino acid residue mutated to a Group 5 amino acid residue at position 153.

65. The nucleic acid of claim 64 having the mutation C153R.

66. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 4 amino acid residue mutated to a Group 1 amino acid residue at position 281.

67. The nucleic acid of claim 66 having the mutation T281A.

68. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 3 amino acid residue mutated to a Group 2 amino acid residue at position 367.

69. The nucleic acid of claim 68 having the mutation N367I.

70. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 3 amino acid residue mutated to a Group 6 amino acid residue at position 367.

71. The nucleic acid of claim 70 having the mutation N367Y.

72. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 1 amino acid residue mutated to Group 4 amino acid residue at position 389.

73. The nucleic acid of claim 72 having the mutation P389S.

74. The nucleic acid of claim 39, wherein the polynucleotide encodes a variant protein of the lovE protein having a Group 1 amino acid residue mutated to a Group 2 amino acid residue at position 389.

75. The nucleic acid of claim 74 having the mutation P389L.

76. The nucleic acid of claim 39 selected from the group consisting of SEQ ID NO:66, SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:74, SEQ ID NO:75, SEQ ID NO:76, SEQ ID NO:78, SEQ ID NO:79, SEQ ID NO:81, SEQ ID NO:82, SEQ ID NO:83, SEQ ID NO:84, SEQ ID NO:86, SEQ ID NO:87, SEQ ID NO:88, SEQ ID NO:89, and SEQ ID NO:90.